

Пространственная ферма

Найти усилия в стержнях 1–6 пространственной фермы, нагруженной в одном узле вертикальной силой \vec{G} и горизонтальной \vec{F} . Ответ выразить в кН.

Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.:ФИЗМАТЛИТ, 2002.– 384 с. (с.86.)

Задача 11.1. 2

$G = 8 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.2. 2

$G = 9 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.3. 2

$G = 12 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.4. 2

$G = 5 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.5. 2

$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 3 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.6. 2

$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.7. 2

$G = 10 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

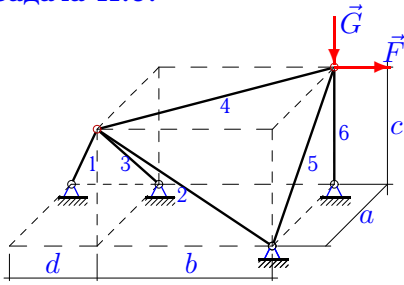
Задача 11.8. 2

$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.9.

2

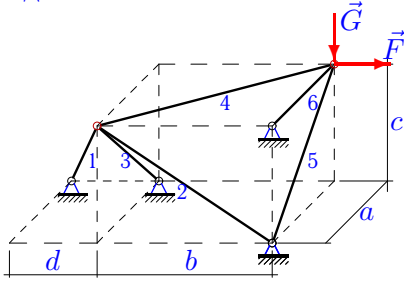


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.11.

2

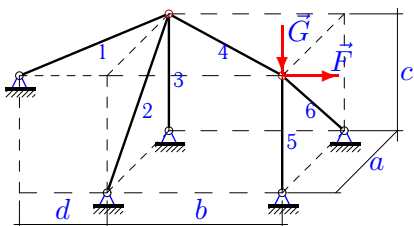


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.13.

2

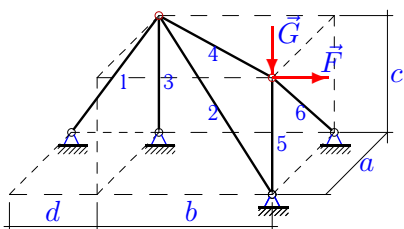


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.15.

2

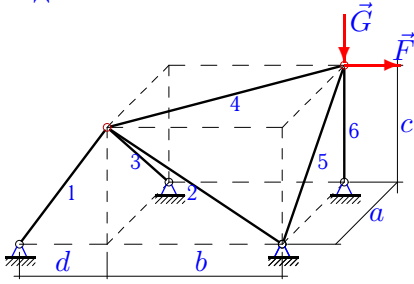


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.17.

2

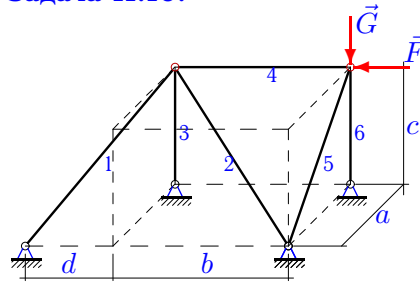


$G = 13 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.10.

2

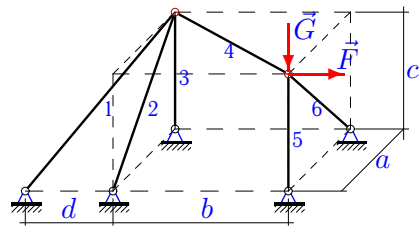


$G = 10 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 3 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.12.

2

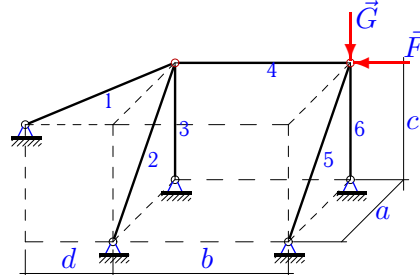


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.14.

2

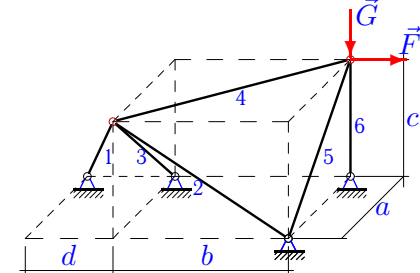


$G = 9 \text{ кН},$
 $F = 4 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.16.

2

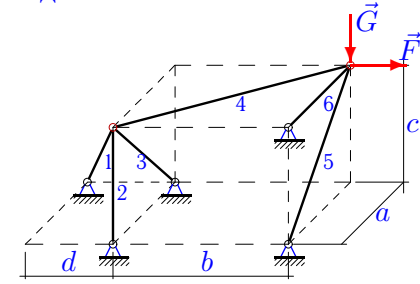


$G = 12 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.18.

2

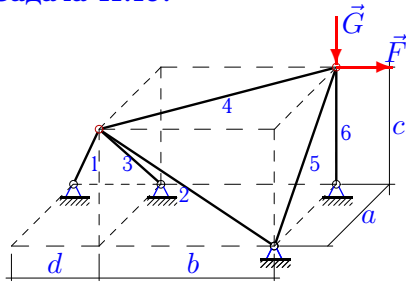


$G = 6 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.19.

2

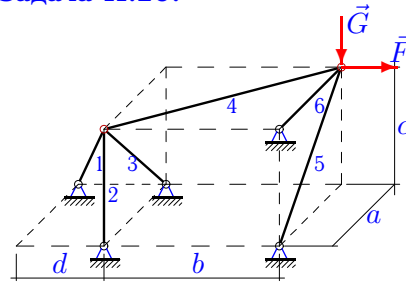


$G = 13 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.20.

2

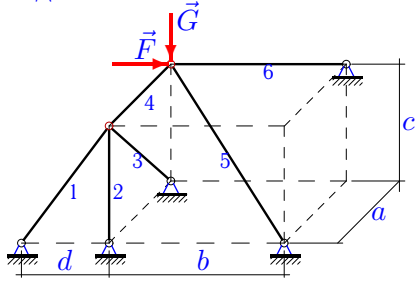


$G = 4 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.21.

2

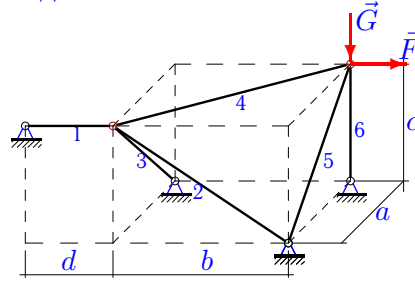


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.22.

2

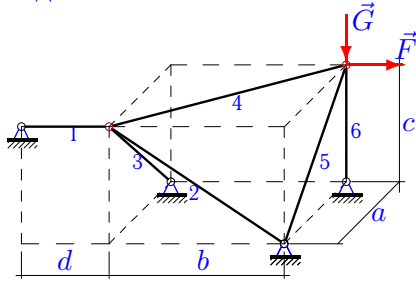


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.23.

2

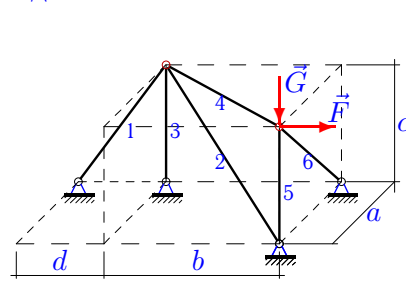


$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.24.

2

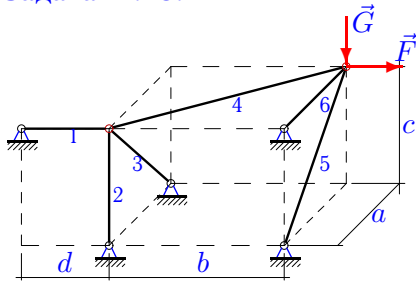


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.25.

2

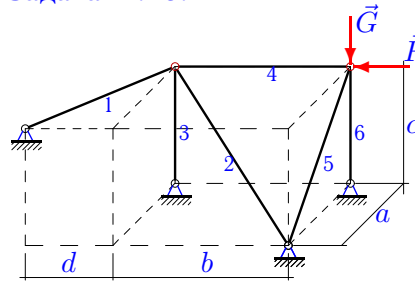


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.26.

2

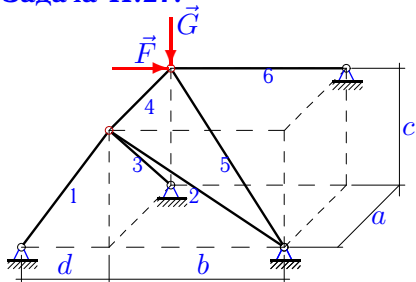


$G = 7 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.27.

2

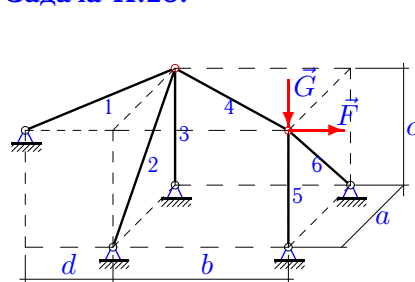


$G = 8 \text{ кН},$
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$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.28.

2

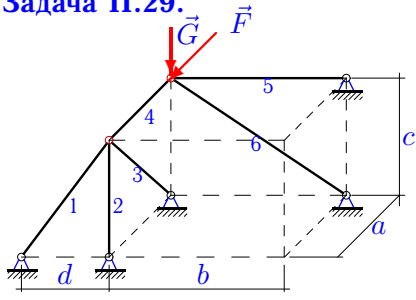


$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.29.

2

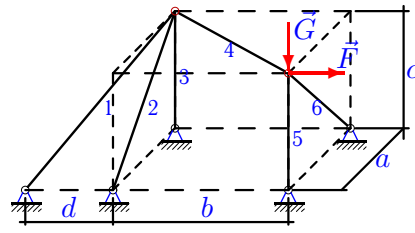


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.30.

2

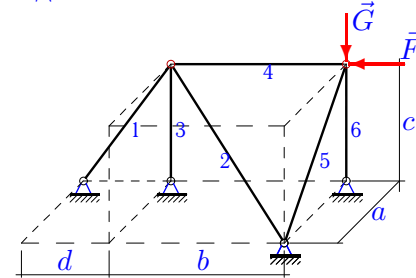


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.31.

2

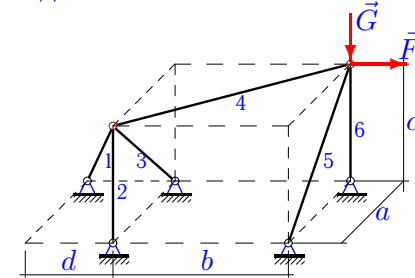


$G = 8 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.32.

2

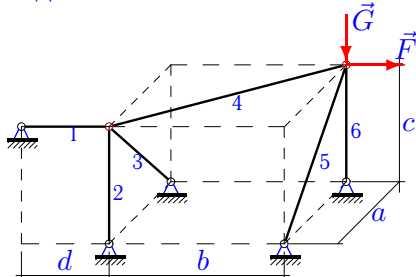


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.33.

2

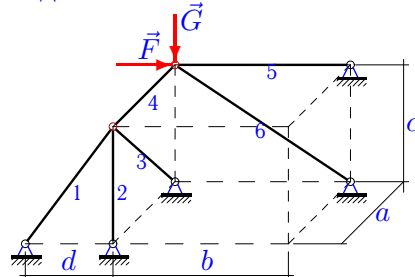


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.34.

2



$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Пространственная ферма

	S_1	S_2	S_3	S_4	S_5	S_6
1	-9.466	11.314	0.000	-8.000	-15.549	13.333
2	-6.285	7.800	-0.000	-8.000	-0.000	-9.000
3	1.667	-0.533	-1.442	1.562	-1.442	-11.200
4	-17.889	-0.000	16.000	-8.000	-5.590	2.500
5	3.162	-1.061	-2.250	1.250	-8.250	-1.061
6	-0.000	-0.714	1.229	-1.000	12.000	-15.620
7	6.771	5.203	-15.624	13.000	-21.937	12.500
8	3.037	-4.301	0.833	1.537	-8.000	-1.167
9	7.550	2.603	-8.537	2.404	-2.134	-9.333
10	-6.974	9.330	-0.000	-8.000	-0.000	-10.000
11	10.414	2.561	-12.499	3.124	-16.225	11.100
12	5.916	-7.289	0.750	1.601	-9.250	-1.458
13	1.414	-3.727	3.333	1.202	-5.667	-1.491
14	-12.649	14.422	-8.000	-4.000	-0.000	-9.000
15	-0.000	-3.536	1.500	3.202	-9.500	-2.915
16	9.487	2.603	-11.470	3.073	-2.867	-10.333
17	2.561	-0.521	-2.867	3.073	-2.867	-11.333
18	3.082	0.750	-4.373	1.601	-11.662	8.750
19	10.414	2.561	-12.499	3.124	-2.884	-11.400
20	1.795	1.333	-2.981	1.202	-4.472	1.333
21	-0.000	8.000	-14.422	12.000	-17.550	9.000
22	4.000	2.603	-2.134	2.404	-2.134	-9.333
23	4.000	3.333	-2.981	2.404	-2.981	-5.333
24	0.000	-3.590	2.667	2.404	-6.333	-2.981
25	1.000	0.800	-1.442	1.562	-14.422	10.800
26	-4.525	8.616	-6.400	-8.000	-0.000	-7.000
27	6.410	4.444	-15.549	13.333	-18.856	8.667
28	3.162	-5.048	2.800	1.562	-8.200	-1.442
29	0.000	-1.250	1.601	-1.000	8.400	-10.934
30	2.449	-3.727	1.333	1.202	-5.667	-1.491
31	-15.549	-0.000	13.333	-8.000	-0.000	-8.000
32	3.082	0.750	-4.373	1.601	-1.458	-9.250
33	1.000	0.800	-1.442	1.562	-1.442	-9.200
34	-0.000	-0.000	-0.000	-0.000	11.500	-16.008